

pressed as he had previously explained ; he believed that the trenails and wedges generally used upon the London and Birmingham, and other railways, were compressed by being driven through steel rings, by heavy mallets, or by a press ; they were most frequently used in the stone blocks to receive the iron spikes.

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March 8, 1842.

The PRESIDENT in the Chair.

“Description of the Tanks for Kyanizing the Timber for the permanent way of the Hull and Selby Railway.” By John Timperley.

Kyanizing  
Timber.

Upon the recommendation of Messrs. Walker and Burges, the Engineers, it was determined that the sleepers of this railway should be kyanized in close vessels, using exhaustion and pressure, instead of in the open tanks usually employed. The present communication, which includes a description of the kyanizing vessels, and an account of the various circumstances connected with the operation, commences by describing the apparatus, as shown by the accompanying drawing, to consist of two tanks, a reservoir, two force pumps, and a double air pump. The tanks are cylindrical, with flat ends, and are made of wrought-iron plates, nearly half an inch in thickness ; they are 70 feet in length, and 6 feet in diameter : at each extremity is a cast-iron door, flat on the outside, and concave on the inner side, provided with balance weights for raising and lowering it. Each end is strengthened by five parallel cast-iron girders, whose extremities are held by wrought-iron straps rivetted on to the circumference of the tanks. Notwithstanding the great strength of these girders, several were broken by the pressure applied during the process. The vessels are lined with felt, upon which is laid a covering of close jointed fir battens, fastened with copper rivets ; this precaution is necessary to prevent the mutual deterioration which would arise from the contact of the iron and corrosive sublimate. There was originally only one brass force pump, 2 inches diameter, and 6 inches stroke ; this being found insufficient, another was added of 4 inches diameter, and henceforward a pressure of 100 lbs. per square inch was easily obtained. The air pump is 10 inches diameter, and 15 inches stroke. Its construction is of the ordinary kind. The author gives in an appendix to the paper a minute description of the various parts of the apparatus, with the details of their dimensions and weight. The process is simple and rapid ; the corrosive sublimate is first mixed with warm water in a trough, in the proportion of 1 lb. of the former to 2 gallons of the latter, the clear solution is then poured off into the

reservoir where water is added till it is diluted to the proper point, which may be ascertained by a hydrometer; a more perfect test is the action of the solution upon silver, which it turns brown at the requisite degree of saturation. The operations of exhaustion and pressure employ eight men for five hours, the whole process occupying about seven hours, during which time from 17 to 20 loads are kyanized in each tank. It is desirable that the timber should remain stacked for two or three weeks after kyanizing before it is used. It was found that about  $\frac{3}{4}$  lb. of corrosive sublimate sufficed to prepare one load (50 cubic feet) of timber. About 337,000 cubic feet of timber were kyanized, the average expense of which, including part of the first cost of the tanks, was about 5*d.* per cube foot. The timber was tested after the process and it was found that the solution had penetrated to the heart of the logs.

The paper contains some interesting tables exhibiting the quantity of solution taken up by different kinds of wood with and without exhaustion; from these it appears that the saturation per cube foot in the latter case did not exceed 2·25 lbs. with specimens of Dantzic timber, whereas it ranged between 12·24 lbs. and 15·25 lbs. with pieces of home-grown wood. The author observes that this striking difference may be partly due to the greater compactness of the foreign timber.

Appended to this communication is a correspondence between Mr. J. G. Lynde and Mr. James Simpson relative to the best tests of the presence of corrosive sublimate, accompanied by letters from Mr. Colthurst and Dr. Reid; the former of these describes the process of kyanizing adopted on the Great Western Railway, and the latter suggests the three following tests; 1st, Dilute hydro-sulphuret of ammonia; 2nd, A strong solution of potassa; dilute nitric acid and proto-muriate of tin, also gold-leaf with this solution; and 3rd, Iodide of potassium. Directions are given for the application of these tests.

Mr. Lynde also mentions the use of a solution of nitric acid and by the application of hydriodate of potash detecting the presence of mercury in a specimen taken from the heart of a log of timber 10 inches by 5 inches and 9 feet long. He also details appearances of the destructive action of the corrosive sublimate upon the iron-work with which it came into contact, which would be prejudicial to the use of iron bolts in kyanized sleepers.

A drawing explanatory of the whole apparatus accompanied the communication.

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In answer to questions relative to the process of exhausting the Mr. T. Oldham.